OU III AR 600
4-30

U.S. Department of Energy
March 1998

Monticello Mill Tailings Site
Monticello Utah
SUPERFUND PROGRAM
INTERIM REMEDIAL ACTION PROPOSED PLAN
for Surface and Ground Water Remedial Action Project

MRAP OUIII AR 600 4-30 INTERIM PLAN
SUPERFUND PROGRAM INTERIM REMEDIAL ACTION
PROPOSED PLAN 3/98

DOE's Proposed Interim Remedial Action Plan

The U.S. Department of Energy (DOE), in concurrence with the U.S. Environmental Protection Agency (EPA) and the Utah Department of Environmental Quality, has developed an interim remedial action plan for the Monticello Mill Tailings Site Surface and Ground Water Remedial Action Project. The purpose of the interim remedial action is to prevent potential exposure to contaminated groundwater, to initiate remedial actions consistent with the final remedy, and to better understand the behavior of contaminants in groundwater at the Monticello Mill Tailings Site in Monticello, Utah.

This fact sheet describes DOE's interim proposed plan and the other alternatives DOE considered for cleanup of contaminated surface water and groundwater at the Monticello Mill Tailings Site and invites public comment on the proposed interim remedial action.

DOE's preferred interim remedial action for reducing contaminant levels until implementation of a long-term solution is finalized is to:

- implement institutional controls (legal or administrative measures used to prevent human contact with contaminants) to restrict use of contaminated groundwater.
- continue groundwater extraction and treatment during excavation and dewatering of the millsite, and continue as necessary in areas of concentrated contamination.
- install a pilot permeable reactive treatment (PeRT) wall, which is an innovative technology, downgradient (east) of the millsite to reduce contaminant levels in groundwater (see effectiveness box on page 7).
- acquire data on changing millsite conditions to support refined groundwater modeling for further alternatives analysis.
- conduct groundwater monitoring to better understand effects of millsite remediation on water quality.

A 30-day public comment period on this proposed plan begins on March 27, 1998 and ends on April 27,1998. This comment period may be extended 30 days, upon written request prior to April 27.

Public Meeting

April 7, 1998
7:00–9:00 p.m.
Monticello High School Auditorium
197 South 2nd West
Monticello, Utah

DOE may make changes to its preference based on new information or comments from the public. The public is encouraged to review and comment on all the alternatives. Send written comments by April 27th to:

Audrey Berry
Public Affairs Specialist
U.S. Department of Energy
Grand Junction Office
2597 B¾ Road
Grand Junction, CO 81503

What Activities Occurred at the Monticello Mill Tailings Site?

The Monticello Mill Tailings Site is a former uranium and vanadium ore-processing mill in the city of Monticello, Utah, that operated from the mid-1940s until 1960. Uranium and vanadium ores from across the region were transported to the millsite for milling and refining. The concentrated uranium ore was shipped off-site for use in the production of nuclear weapons components. The concentrated vanadium ore was shipped off-site for use in the hardening of steel. Processing of the ores resulted in the generation of mill tailings, which were stored on the site in four tailings piles. The tailings contain high concentrations of a variety of radioactive materials and metals that pose a risk to human health and the environment.

How Did the Site Get Contaminated?

The major sources of contamination are the mill tailings located in four piles at the millsite. Montezuma Creek flows adjacent to the mill tailings piles and has carried tailings downstream where they have been deposited in and adjacent to the creek. Wind has blown some tailings off the millsite, and mill tailings were intentionally used as backfill material on nearby properties. Water moving through the tailings has contaminated the shallow groundwater. Compared to portions of the alluvial aquifer that are not affected by millsite activities, groundwater beneath the site contains elevated concentrations of a variety of contaminants that, in some cases, exceed State of Utah and Federal groundwater standards.

Enforcement Actions

The Monticello Mill Tailings Site was placed on the National Priorities List (Superfund) in 1989 because of risks associated with contaminated materials related to past milling activities. The millsite and nearby contaminated properties are currently being cleaned up as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). DOE, the EPA, and the State of Utah entered into a Federal Facilities Agreement in December of 1988. This agreement specifies that DOE is the lead Federal agency responsible for clean up at the millsite and gives oversight authority to the EPA and the Utah Department of Environmental Quality. A Record of Decision signed in 1990 specifies how the millsite and surrounding properties will be remediated, but did not specify how the surface water and groundwater would be remediated.

How Is Cleanup of the Site Organized?

To cleanup the site more efficiently, it was divided into three different parts called Operable Units. Operable Unit I (OU I) includes the former Bureau of Land Management compound and tailings piles on the millsite. Current OU I activities include excavation and removal of contaminated materials with subsequent disposal in a repository located one mile south of the millsite. Excavation of the tailing piles includes dewatering activities, which involve

treatment of recovered water. Operable Unit II (OU II) includes properties immediately adjacent to the millsite contaminated with windblown tailings and tailings that were used as fill. Cleanup of OU II properties is nearly complete.

Operable Unit III (OU III) consists of surface water and groundwater contamination from the millsite and the contaminated soils and sediments deposited downstream of the millsite in and adjacent to Montezuma Creek.

The proposed interim remedial action addresses the groundwater portion of OU III, specifically groundwater beneath and downgradient (east) of the millsite. The extent of contaminated groundwater is shown in the figure on page 10.

Site Conditions

The millsite and adjoining areas within the Montezuma Creek valley are underlain by two groundwater-bearing units (aquifers). The upper unit is called the alluvial aquifer; the surface of the alluvial aquifer (water table) is generally encountered between 2 and 10 feet below the ground surface. This alluvial aquifer discharges to Montezuma Creek in several areas east of the millsite. This aquifer has been contaminated by past millsite activities. The contaminants of most concern include uranium, vanadium, lead-210, and arsenic.

The sandstone aquifer beneath the alluvial aquifer, called the Burro Canyon aquifer, (which occurs approximately 10 - 55 feet below the surface) is not contaminated. This lower aquifer is separated from the upper alluvial aquifer at and directly east of the millsite by layers of sandstone and shale that restrict downward movement of water. About 4,000 feet east of the millsite, erosion of sandstone and shale allow the groundwater to move upward from the lower aquifer (Burro Canyon) to the alluvial aquifer.

What Is an Interim Remedial Action and Why Is It Needed?

Interim remedial actions are actions that partially clean up or stabilize a site and are typically followed by other actions that complete the steps to provide long-term protection of human health and the environment. Interim actions contribute to overall cleanup but are often short-term, temporary steps. Interim remedial actions are taken to prevent exposure to contamination, control risks posed by contamination, prevent further spread of contamination, or achieve significant risk reduction quickly. For groundwater actions, they allow observation of aquifer changes useful in evaluating the final remedy. The final remedial decision for on-site and off-site groundwater will be made after millsite excavation is completed and the effects of the interim remedial action are better understood.

Is There Any Danger to the Community?

Properties directly east of the millsite are currently used for agricultural and recreational purposes. In the future, the millsite may be developed into a golf course or other recreational uses. Residential development in areas adjacent to the millsite would likely increase. The alluvial aquifer is currently not used as a source of drinking water. However, in the unlikely event that the aquifer is used in the future as a source of drinking water, the risk to human health would be unacceptable. The most significant risks are caused by the presence of arsenic and uranium contamination. For substances that may cause cancer, risks posed by consumption of the groundwater are presently as much as 4 times greater than acceptable levels. For substances

that may cause other adverse effects to human health besides cancer, risks are as much as 10 times greater than acceptable levels.

Monitoring of water quality during excavation and removal of tailings and contaminated soil at the millsite has indicated that these activities may further increase contaminant concentrations in the groundwater. Because it is not possible to reliably predict the effects millsite excavation will have on OU III, this interim remedial action is proposed to prevent use of contaminated groundwater by implementing institutional controls, install a PeRT wall to accelerate contaminant reduction in the groundwater, and obtain information about changing conditions of the alluvial aquifer.

Analysis of Alternatives

This section provides a brief discussion of the alternatives being considered for interim remedial action of OU III groundwater. The Feasibility Study for OU III contains an evaluation for a whole spectrum of remedial alternatives that are being considered for the final remedial action at the site. This includes a range of options for institutional controls (voluntary restriction, deed annotation, administrative controls through the State Engineer) and groundwater extraction and treatment technologies (such as conventional water treatment or the field scale PeRT wall). However, only two options are being considered to achieve interim action goals.

The remedial alternatives for a site are evaluated against the nine CERCLA criteria. These criteria are defined on page 5.

The final remedial action for the site will need to meet more extensive environmental requirements (ARARs) than does the interim action. The goal of the interim action is to prevent the use of contaminated groundwater and implement an innovative treatment technology to improve water quality. For a discussion of the ARARs that must be met for the final remedial action, refer to the Feasibility Study.

The following discussion describes the two alternatives considered and addresses the most important evaluation criteria related to the goals of the interim remedial action. This discussion is summarized in Table 1 on page 6, along with the other evaluation criteria, to better compare the two alternatives.

1. No Action

The consideration of the no action alternative is required by CERCLA. The no action alternative includes long-term monitoring, which accounts for the costs given in Table 1.

2. Institutional Controls, PeRT Wall Installation, Millsite Dewatering, and Monitoring

Institutional controls prohibiting the use of water rights within the area of contaminated groundwater will be implemented through the State Engineer. Groundwater and surface water monitoring would be used initially to assess the effects of millsite cleanup activities on the concentration of contaminants in the groundwater.

In-situ treatment of groundwater would be accomplished with a **Permeable Reactive Treatment (PeRT) wall** installed across the contaminant plume. Contaminants are removed as groundwater flows through the wall, thereby preventing additional contaminant migration beyond the millsite boundary. The exact location of a PeRT wall has not been finalized and much of the site-specific information needed has not been obtained. Laboratory treatability studies are ongoing and field

Overview of Nine Evaluation Criteria	
• Overall Protection of Human Health and Environment addresses whether or not a remedy provides adequate protection and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls. • Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy will meet all of the Federal and State environmental statutes and/or provide grounds for invoking a waiver. • Long-term effectiveness and permanence refers to the ability of a remedy to reduce risk and maintain reliable protection of human health and the environment over time once cleanup goals have been met. • Reduction of toxicity, mobility, or volume through treatment is the expected performance of the treatment technologies that may be employed in a remedy.	• Short-term effectiveness refers to the speed with which the remedy achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation period. • Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution. • Cost includes capital, operation, and maintenance costs. • State Acceptance indicates whether, based on its review of the Remedial Investigation/Feasibility Study and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative. • Community Acceptance is assessed in the Record of Decision (or Interim Record of Decision) following a review of the public comments received on the Remedial Investigation/Feasibility Study report and the Proposed Plan (or Interim Proposed Plan).

treatability studies will be completed to optimize size and configuration of the PeRT wall.

There are several locations under consideration for a PeRT wall. One location could be near the eastern boundary of the millsite. Other potential locations are within the boundaries of the millsite or downgradient of the eastern boundary of the millsite. Wherever a PeRT wall is located, it would be oriented perpendicular to the direction of groundwater flow and extend across most, if not all of the alluvial aquifer.

Several different configurations are feasible for a PeRT wall. One configuration would use a wall consisting entirely of reactive material placed across the contaminant plume. This configuration allows contaminated groundwater to migrate through the PeRT wall without changing or redirecting the overall flow path within the aquifer. Another configuration is a funnel-and-gate system that consists of an impermeable barrier (such as a slurry wall) that channels groundwater flow through a gate made of reactive-material. This configuration is more economical than a continuous wall of reactive material because the material required for a slurry wall is less expensive than the reactive material. Other potential configurations use multiple gates or multiple reactive-material cells within a single gate. The configuration selected would be optimized for site-specific geologic and hydrologic conditions, operating and maintenance requirements, and economic considerations.

Table 1. Comparison of Alternatives Against the Nine CERCLA Criteria

Criteria	Alternative 1 No Action	Alternative 2 PeRT Wall, Monitoring and Institutional Controls
Overall Protection of Human Health and the Environment	Not protective. Allows unrestricted use of contaminated groundwater.	Assumes protectiveness through use of institutional controls. Groundwater treatment and PeRT wall assumed to further reduce contaminant mass.
Compliance with ARARs	No compliance. Current conditions would exist.	Will comply with construction and operational requirements. Will at least contribute to, or possibly meet, water quality standards.
Short-term Effectiveness	None; current conditions would exist.	Effective at meeting goal of limiting use of contaminated groundwater. Expected to reduce mass of contaminants.
Long-term Effectiveness	None, except by natural attenuation.	Interim actions are not required to provide long-term solutions. Long term effectiveness to be determined through monitoring and modeling. Final solution to be selected at a later date.
Reduction of Toxicity, Mobility and Volume through Treatment	None, except through natural processes.	PeRT wall could reduce mobility of contaminants. PeRT wall and dewatering with treatment reduce mass of contaminants on site and down gradient of barrier.
Implementability	Implementable—represents current situation.	Implementable—uses standard constructions practices and available expertise.
Cost	Capital $ 39,000 O&M 161,000	Capital $2,516,000 O&M 414,000
State and Community Acceptance	TBD	TBD

NA=not acceptable
TBD=to be determined

Before emplacement of the PeRT wall, laboratory treatability studies would be conducted with at least two different reactive materials (zero-valent iron and amorphous ferric oxyhydroxide) to determine the most suitable material for site-specific conditions.

In conjunction with the cleanup of OU I, **groundwater dewatering and treatment** would continue and also contribute to the remediation of OU III.

Groundwater and surface water monitoring would be conducted to determine the effectiveness of the PeRT wall and groundwater treatment in restoring the aquifer to natural conditions.

Effectiveness

Effectiveness of the PeRT wall at the millsite is unknown because the technology is relatively new. The pilot test will help gain additional information to better understand this new technology. However, PeRT walls have been installed under conditions similar to those that exist at Monticello and results are promising. Laboratory treatability studies of potential materials will ensure optimal design of the system. Proper procedures will be used to protect workers and local residents during construction of the PeRT wall.

Because it is not known what volume of water will be treated during millsite excavation, the effectiveness of groundwater treatment during millsite excavation is unknown. Monitoring results will be used to assess the effectiveness of the PeRT wall and groundwater treatment.

Summary

The interim remedial action is only a short-term measure. Continued monitoring of groundwater quality as cleanup of OU I proceeds and during the interim remedial action will provide the time needed for evaluation and development of a long-term plan for cleanup of OU III. It is expected that dewatering activities will accelerate the reduction of contaminant concentrations in the groundwater.

By taking an interim action the overall effectiveness of groundwater cleanup will be greatly enhanced. Implementing the interim remedial action will complement the millsite cleanup activities and will have no negative effect on those efforts. This interim remedial action provides the best balance of the evaluation criteria, is consistent with the long-term strategy for addressing OU III, and will not adversely affect the ultimate solution for groundwater cleanup or soil and sediment cleanup.

Construction activities for the proposed interim remedial action would be initiated in October and November of 1998. The system would operate for 4 to 5 years after millsite restoration, with monitoring occurring at least two times per year. At the end of this time, information will be sufficient to finalize a remedial action for OU III.

Recommended Alternative

Because of its overall effectiveness and on the basis of the evaluation in this document and the Administrative Record for the site, DOE recommends the implementation of Alternative 2. This alternative includes institutional controls, continued groundwater extraction and treatment at the millsite prior to discharge to Montezuma Creek, PeRT wall installation, and surface water and groundwater monitoring.

Public Comment Period

DOE will accept written comments on its proposed interim remedial action for 30 days beginning on March 27, 1998. The Department will make its final decision on the interim remedial action only after considering public comments. At the end of the comment period, DOE will prepare a Responsiveness Summary addressing the comments. DOE will place all written comments and the Responsiveness Summary in DOE's Administrative Record for the Monticello Mill Tailings Site interim remedial action.

Administrative Record Review

The Administrative Record for the Monticello Mill Tailings Site contains the documents that were prepared to assist in making decisions on site cleanup. They can be reviewed at the Monticello City offices. The Record can be reviewed at the following locations:

Monticello City Offices
17 North 1st Street East
Monticello, UT 84535
Hours: 8 a.m.–4:30 p.m.
Tuesday and Wednesday evenings 6:00 to 8:00 p.m.

DOE Grand Junction Office
2597 B¾ Road
Grand Junction, CO 81503
Hours: 8 a.m.–4:30 p.m.

Public Meeting

April 7, 1998
Monticello High School
197 South 2nd West
Monticello, UT 84535
7:00–9:00 p.m.

For More Information

For more information, contact DOE

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Grand Junction, CO 81503
(970) 248–7612

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2597 B¾ Road
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(970) 248–7727
1–800–269–7145 (Utah only)

Regulatory Agency Oversight Contacts

U.S. Environmental Protection Agency
Paul Mushovic, Remedial Project Manager
(303) 312-6662
Mario Robles, Remedial Project Manager
(303) 312-6160

Utah Department of Environmental Quality
David Bird, Project Manager
(801) 536-4100
Kathy Grundhauser, Community Relations
(801) 536-4486

Monticello Mill Tailings Site
Interim Remedial Action Proposal Comments

Your input on the interim remedial action proposal for the Monticello Mill Tailings Site is important to the U.S. Department of Energy. Comments provided by the public are valuable in helping us select the cleanup action for the site.

You may use the space below to write your comments. **To submit your comments, mail this page to Interim Remedial Action Proposal Comments; Audrey Berry; U.S. Department of Energy Grand Junction Office; 2597 B¾ Road, Grand Junction, CO 81503.** Comments must be postmarked by April 23, 1998. If you have questions about the comment period, please contact Ms. Berry at 970-248–7727 or 1–800–269–7145 (Utah only). Thanks for your input!

Name _____

Address _____

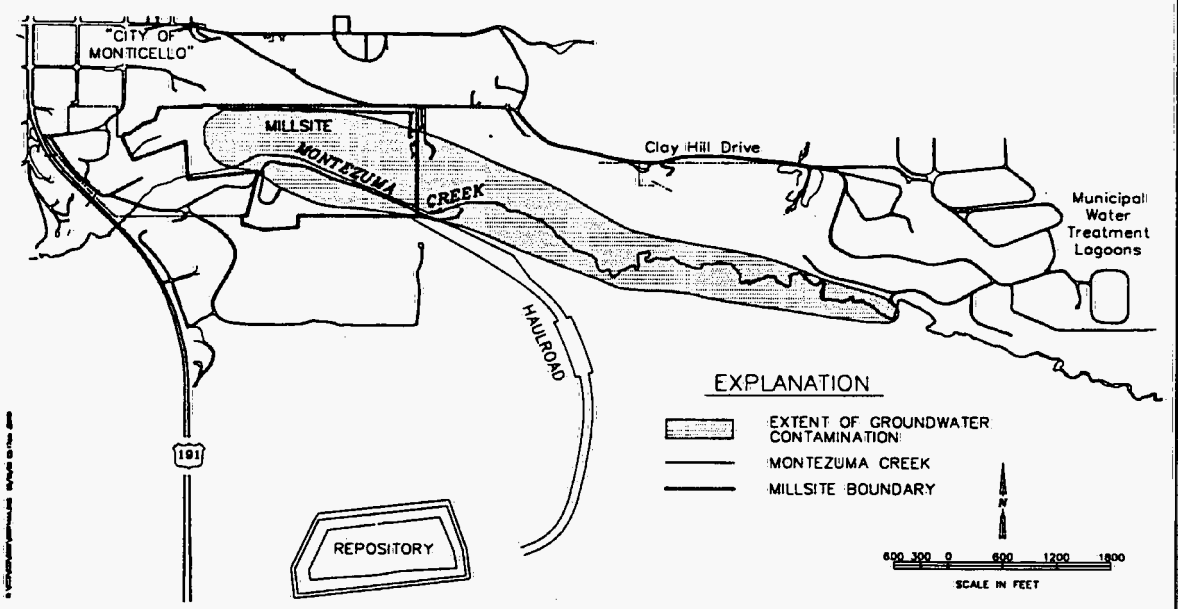
City _____ State _____

Zip _____

Phone _____

Would you like to be on the mailing list?
Yes_____ No _____

LOCATION MAP FOR OPERABLE UNIT III OF THE MONTICELLO MILL TAILINGS SITE



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